

# **505 Precast/Prestressed Concrete Structures Quality Management Plan**

## **505.1 INTRODUCTION**

The Precast/Prestressed Concrete Structures Quality Management Plan (QMP) establishes the procedure for becoming a pre-qualified supplier of precast/prestressed concrete products (barrier, cattle guards, noise wall components, drainage boxes, bridge girders and other structural elements, circular pipe, pipe arch culverts, concrete box culverts, etc). The QMP assists the Utah Department of Transportation in assuring that precast/prestressed concrete fabrication plants are capable of constructing quality concrete products. Only products produced by a pre-qualified supplier will be accepted and certified for UDOT use.

## **505.2 DEFINITIONS**

Precast concrete is any concrete product not cast in its final location. This is irrespective of the distance between the casting location and the point of installation, or the size or complexity of the finished product.

UDOT certification of a supplier's plant comprises a review of the supplier fabrication methods, personnel training, and quality control systems.

UDOT pre-qualification of a supplier is separate from UDOT certification. It is required in order to provide products to a UDOT project. Pre-qualification requires UDOT certification and a legally binding written commitment to the quality principles and standards outlined in this document.

## **505.3 CATEGORIES OF PRECAST CONCRETE FABRICATORS**

Suppliers of precast concrete products are pre-qualified in three separate categories.

### **Category One – Precast Concrete**

This category includes most precast concrete products. Products in this class are simple structures which generally stand alone. Examples include: drainage boxes, noise wall components, safety barrier, and pipe. Category one suppliers are restricted to production within UDOT certified, established permanent plants.

### **Category Two – Prestressed / Post-Tensioned Concrete**

This category includes complex precast concrete structural elements requiring prestressing tendons, post-tensioning tendons, and all products produced by category one. Category two suppliers must produce from UDOT certified plants. These plants may be established permanent locations or temporary project specific locations.

### **Category Three – Site Cast Concrete**

This category includes complex structural elements not requiring prestressing tendons which due to size or project time requirements are fabricated at a

temporary project specific location. Category three fabricators must produce from a UDOT certified plant at a temporary project specific location.

#### **505.4 PRE-QUALIFICATION OF PRECAST/PRESTRESSED CONCRETE SUPPLIERS**

Applicants shall submit to UDOT Central Materials, a letter requesting that it be designated as a pre-qualified supplier. The letter shall include the following:

- A. Proof the fabrication plant producing precast/prestressed concrete products is currently certified by UDOT Central Materials as outlined in this document.
- B. Name and phone number of the Quality Control (QC) Manager at each production location who may be contacted for scheduling of inspections and general information.
- C. The category or categories under which the supplier is seeking pre-qualification.
- D. State a commitment to the following:
  - 1. Meet or exceed UDOT's Standard Specifications, including all applicable ASTM and AASHTO specifications.
  - 2. Make available to UDOT Central Materials all records required by this document upon request.
  - 3. Maintain current certification through national professional associations. Attach documentation of certification.
    - a. Fabricators of prestressed concrete products through the Precast/Prestressed Concrete Institute (PCI).
    - b. Fabricators of precast concrete products, other than prestressed and concrete pipe manufacturers, through the Precast/Prestressed Concrete Institute (PCI) or the National Precast Concrete Association (NPCA).
    - c. Fabricators of concrete pipe and pipe arch culvert using "dry cast" or "zero slump" manufacturing process, through the American Concrete Pipe Association (ACPA)
    - d. Fabricators of "site cast" concrete are encouraged but not required to certify through the Precast/Prestressed Concrete Institute (PCI).
  - 4. Submit to a minimum of one UDOT plant inspection per year in order to maintain certification.
- D. A statement verifying that the signer of the letter has the legal authority to bind the company.

Notification of acceptance as a Pre-Qualified Precast/Prestressed Concrete Supplier will be made in writing by UDOT Central Materials.

**505.5 SUPPLIER PLANT CERTIFICATION AND INSPECTION (ALL CATEGORIES)**

A pre-qualified supplier will adhere to the guidelines set forth in this document. Suppliers will pass a UDOT inspection prior to acceptance as a pre-qualified fabrication plant. UDOT will schedule an initial plant certification inspection visit at the request of the supplier. The request should be made at least six weeks prior to the planned start of production for a UDOT project to allow for inspector scheduling. The inspector will check the plant in accordance with the requirements of this document. Upon completion the inspector will submit a written report to the fabricator outlining all deficiencies observed. The supplier is required to address all deficiencies noted in the report before requesting another certification inspection. Upon completion of a deficiency free inspection a letter of certification will be issued by UDOT Central Materials.

Once certified, each plant will be subject to a minimum of one inspection per year. Suppliers may or may not be given advance notice of an inspection. Failure in one or more of the requirements may result suspension of certification. Suspended suppliers may not provide products to UDOT projects during suspension and must address deficiencies within 30 days or certification will be revoked. Within the 30 day period the supplier must submit a letter to UDOT Central Materials outlining the corrective action taken for each violation. If the deficiencies are not addressed within 30 days the supplier's certification is revoked and they are removed from the pre-qualified list.

Suppliers suspended for a second time within a twelve month period automatically have their UDOT certification revoked and are removed from pre-qualified status. Additionally, suppliers may have their certification revoked and be removed from pre-qualified status for any of the following:

- A. Loss of required professional certification.
- B. Loss of required certified staff.
- C. Gross negligence.

Disqualified suppliers have their UDOT certification revoked for at least one year. The supplier may apply for certification and reinstatement as a pre-qualified supplier no sooner than ten months after the revocation. At this time the supplier will be allowed to start the qualification process and work towards becoming a pre-qualified supplier of precast/prestressed concrete products. Revoked certification and disqualification of a supplier may be appealed to the UDOT Director for Construction and Materials. Upon review of the situation, the Director's decision is final.

Provide the following information for all UDOT inspection visits.

### **505.5.1 Supplier QC Policies and Procedures**

Provide adequate training to familiarize all pertinent employees with the company's QC procedures. Have a written company QC policy statement, a copy of UDOT's "Steel and Concrete Construction Manual," and a QC manual which includes, at a minimum, the plant certification technical criteria set forth in this document. Each pertinent employee shall receive a copy of all three. Have a designated Quality Inspector (QI) (see section 505.3.3.1.B) present on every work shift. Quality Inspectors must be properly trained and thoroughly familiar with all required QC procedures. Additionally, QI's shall have the authority to fully enforce procedures.

The ultimate success in achieving a quality product is heavily dependent upon the company's and employee's commitment and the employee's understanding of the company's QC procedures. In order to successfully implement and enforce compliance with the company's QC policies, a QI should report to an individual with the authority and knowledge to oversee plant operations.

### **505.5.2 Supplier Plant Requirements**

#### **505.5.2.1 QC Procedures**

Develop, periodically review and update as necessary, a company QC policy statement and manual. The QC Manual must be approved by UDOT Central Materials prior to acceptance as a pre-qualified supplier.

Designate a QI for every work shift. Category one and three suppliers' QI must be UDOT TTQP CTT certified. Category two fabricators QI must be PCI Level I certified. The QI must be present during stressing operations, final rebar inspection, all concrete placements, and final inspection prior to shipment (or placement for category three).

Category one and three suppliers QC Manager must be UDOT TTQP CTT and CsTT certified. Category two suppliers QC Manager must be PCI Level II certified.

Suppliers' batch plant or off-site ready-mix batch plants must be pre-qualified under UDOT's "Quality Management Plan: Ready-Mix Concrete".

Provide necessary training to designated QI and line personnel. QI shall have ready access to the latest company QC Manual.

Conduct meetings with the plant manager or designated representative and QC personnel, a minimum of once every three months to review the plant's QC procedures, discuss possible changes and implement any procedural changes.

The plant manager or designated representative shall review and evaluate the QC techniques of all QI once every six months to assure compliance with QA Section guidelines and certification procedures.

Submit to a minimum of one plant inspection, each year, by a QA Section Inspector.

Formally consider and address each deficiency noted in the QA Section inspection reports and conduct subsequent follow-up meetings to assure compliance.

#### **505.5.2.2 Required QC Records**

Employee's current TTQP and PCI certifications (as appropriate), certification documents, and QC training records.

Written "new employee" training and/or orientation policy in the company files.

Copies of the plant's QC policy statement, QC manual, and UDOT's "Steel and Concrete Construction Manual."

Proof of current PCI, ACPA, or NPCA certification.

Complete QC inspection checklist, signed by the QI, for each work shift.  
Linear QC charts for air, slump, unit weight and concrete temperature for all units/lots produced for UDOT projects.

Minutes of meetings held between the plant manager and QC personnel.

Plant manager's evaluation of the QI performance of job duties.

Memorandum signed by the plant manager, detailing plant's response and follow-up to each specified deficiency documented during a UDOT inspection.

#### **505.5.2.3 Calibration and Certification of Test Equipment.**

All testing equipment or devices used for measuring material quantities shall be in good repair, calibrated and certified as specified in AASHTO, ASTM, and the UDOT Standard Specifications.

Maintain certification of beams, scales, water meters and moisture probes at the batch plant as per UDOT Standard Specifications. If the supplier chooses to use an off-site Ready-Mix concrete supplier, the supplier must maintain a copy of the Ready-Mix company's batch plant certification records for beams, scales, water meters and moisture probes.

Maintain certification of air meters, unit weight buckets, slump cones, plastic concrete cylinder molds & rods, and thermometers.

Broken or malfunctioning equipment must be removed from service immediately and replaced with new or repaired/recalibrated equipment.

Use UDOT approved laboratories for concrete compressive strength tests which are used for prestressed girder release breaks or any informational concrete compressive strength tests. A list of UDOT approved laboratories can be obtained through the UDOT Materials website (<http://www.udot.utah.gov/go/materials>)

#### **505.5.2.4 Required Test Equipment Records**

Notation on inspection checklist documenting which test equipment was used on each shift and their corresponding certification dates.

Documentation proving the plant laboratory or the contract laboratory is UDOT qualified.

### **505.6 SUPPLIER PLANT CERTIFICATION AND INSPECTION (CATEGORY THREE)**

Suppliers pre-qualifying under category three must meet additional requirements.

#### **505.6.1 Structural Construction Experience**

As part of the certification process outlined in 505.5, provide the following.

Documentation showing of a minimum of five years experience constructing highway bridges for state departments of transportation or other similar entities. List details of project completed within the last three years. Provide contact information for projects performed for owners other than UDOT.

The construction experience requirement is waived for pre-qualified category two suppliers.

#### **505.6.2 Fabrication Plant Requirements**

Comply with the requirements of 505.7

### **505.7 SITE CAST CONCRETE (TEMPORARY PROJECT SPECIFIC PLANT)**

Some projects bid by UDOT may require some or all precast products to be manufactured near or within the project boundaries from a temporary project specific plant (site cast). While meeting the requirements of section 505.5, suppliers providing site cast products must also meet the following requirements.

- A. Provide a project specific staffing plan showing the Quality Inspector for each shift and the supplier's site QC Manager. Include verification that these personnel have the required UDOT TTQP certifications.
- B. Provide a project specific layout (plan) for the precast area. Identify casting beds, storage area (including any dunnage needed), crane locations, access points for ready mix trucks, location of batch plant, etc. Be specific and detailed.
- C. Ensure that the precast area remains clean. Prevent mud and other debris from contaminating forms, rebar, and other equipment. Provide dunnage in storage area. Do not place completed products directly on the ground.
- D. Ensure that precast elements are not damaged during placement or assembly. Such damage, even if repaired or otherwise accepted by the project, is grounds for revocation of certification and pre-qualification.

Fabrication cannot begin until these requirements are met and the temporary project specific plant is certified. As with permanent plants, certification and pre-qualification may be revoked at anytime if requirements are not met.

### **505.8 UDOT NOTIFICATION OF START OF PRODUCTION**

In addition to the regular communication between the UDOT Resident Engineer and the general contractor, or between the general and sub-contractor, all suppliers shall notify UDOT Central Materials 14 days prior to project startup and then 24 hours prior to fabrication of any product to be used on UDOT specification controlled projects.

UDOT Central Materials  
Attn: Concrete Engineer  
4501 South 2700 West, Box 148410  
Salt Lake City, Utah 84114-8410

Phone: 1-801-965-3814  
Fax: 1-801-965-3843

## **APPENDIX A      UDOT INSPECTOR GUIDELINES**

### UDOT Inspector Check List:

1. Examine the plants QC Policy Statement and Manual.
2. Verify that the plant has a copy of UDOT's "Steel and Concrete Construction Manual" on file.
3. Review the distribution of QC Policy Statement and manual and its availability to employees.
4. Review QC training records.
5. Review the plant records to confirm that a QI has been assigned to each work shift and has signed the inspection checklist.
6. Interview the person(s) responsible for QC policies and procedures.
7. Verify the QI lines of authority.
8. Examine the plant's equipment certification records.
9. Review QC inspection checklist for compliance.
10. Review QC linear control charts for compliance.
11. Inspect testing equipment for damage and ensure all equipment is in good repair.
12. Verify UDOT qualification of plant or consultant laboratory.
13. Verify current ACPA, NPCA or PCI plant certification.
14. Verify concrete batch plant is pre-qualified under UDOT's "Quality Management Plan: Ready-Mix Concrete."